



COMMONLY OWNED CLAIMS

1. (Currently Amended): A non-naturally occurring quantum information processing platform offering precise control over its fabrication and operation comprising, a plurality of artificially configured quantum information processing elements each having, a man-made cage, up to 100 nanometers in diameter, defining a calculated, artificial cavity that is bioengineered and formed from a plurality of artificially induced self-assembling purified Clathrin protein molecules, and one or more man-made cargo elements calculatedly located within the man-made cavity, wherein at least one of the cargo elements comprises a man-made, artificially configured qubit element that is by design programmable into a plurality of one or more logical states, which states can deliberately entail, promote, enhance, and exploit the properties of quantum coherence, superposition, entanglement, communications, and other quantum phenomena that are not practically used in naturally occurring systems because by definition the latter do not offer the precise control over their fabrication and operation that is required for quantum information processing, and one or more of these man-made elements can be calculatedly expressed as non-naturally occurring quantum memory, register, bus, wire, logic gate, communications, error correction, i/o module, encoder, decoder, and other information processing functions not found in nature, enabling the functional basis of a man-made quantum computer.

2. (Currently Amended): A non-natural quantum information processing platform according to claim 1, wherein the artificially configured quantum information processing elements comprise, artificially configured receptors for artificially capturing and calculatedly positioning one or more artificially configured cargo elements within the man-made cavity such that it enables non-natural placement of one or more cargo elements with minimal inter-element spacings, thereby allowing dense cargo element packing and with minimal inter-cargo interference.

1 3. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 2, wherein the artificially configured quantum information processing elements
3 comprise,
4 an artificial vesicle located within the artificially configured cage and enclosing one or more
5 artificially configured cargo elements, wherein the artificially configured receptors extend
6 through the man-made vesicle to capture and calculatedly position an artificially configured
7 cargo element within the man-made vesicle such that it enables non-natural placement of one or
8 more cargo elements with minimal inter-element spacings and with minimal inter-cargo
9 interference.

1 4. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 3, wherein the artificially configured quantum information processing elements
3 comprise,
4 artificially configured adaptors calculatedly disposed between the receptors and the
5 artificially configured cage and artificially binding to the one or more artificially configured
6 receptors such that it enables non-natural placement of one or more cargo elements within the
7 man-made vesicle.

1 5. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the artificially configured quantum information processing elements
3 comprise,
4 a man-made vesicle located within the artificially configured cage and artificially and
5 calculatedly enclosing one or more artificially configured cargo elements.

1 6. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the artificially configured quantum information processing elements
3 comprise,
4 artificially configured molecular tethers for artificially capturing and non-naturally
5 positioning one or more artificially configured cargo elements within and or outside the man-
6 made cavity.

2 7. (Currently Amended): A non-natural quantum information processing platform according
3 to claim 1, wherein the artificially configured quantum information processing elements
4 comprise,
5 artificially configured direct cage bonding for artificially capturing and non-naturally
6 positioning one or more artificially configured cargo elements within and or outside the man-
7 made cavity.

1 8 (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the artificially configured quantum information processing element
3 comprise, artificially configured receptors, molecular tethers and direct cage bonding for
4 artificially capturing and non-naturally positioning one or more artificially configured cargo
5 elements within and or outside the man-made cavity.

1 9. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the one or more artificially configured cargo elements of a subset of the non-
3 natural quantum information processing elements further comprises a non-permeable, calculated,
4 man-made cavity.

1 10. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 3, wherein the one or more man-made vesicles of a subset of the non-natural quantum
3 information processing elements further comprises a man-made vesicle forming an artificial,
4 non-permeable, calculated, man-made cavity.

1 11. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein
3 the artificially configured self-assembling cage is man-made to be electrically neutral and
4 calculatedly inhibits charge transfer between the artificially configured cage and its enclosed,
5 artificially configured cargo elements, thereby deliberately promoting and enhancing quantum
6 coherence.

1 12. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the artificially configured self-assembling cage calculatedly reduces the
3 natural tendency of a plurality of logical states in a quantum coherent state to collapse into a
4 classical decoherent state.

1 13. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein ~~the~~ an artificially configured non-qubit-only cage calculatedly inhibits non-
3 quantum information processing cargo elements from interfering with bio-engineered qubit cargo
4 element operation in one or more other artificially configured cages that calculatedly function as
5 man-made quantum memory, register, bus, wire, logic gate, communications, error correction,
6 i/o module, encoder, decoder, and other information processing functions not found in nature.

1 14. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 3, wherein the man-made vesicle, by human design, is calculated to be electrically
3 neutral and calculatedly inhibits charge transfer between the man-made vesicle and its enclosed,
4 artificially configured cargo elements.

1 15. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 3, wherein the artificial vesicle is insulative and non-naturally reduces the usual
3 tendency of a plurality of logical states in a quantum coherent state to collapse when observed or
4 interfered with into a classical decoherent state.

1 16. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 4, wherein the artificially configured receptors and adaptors are by human design
3 electrically neutral and calculatedly inhibit charge transfer between the man-made vesicle and
4 artificially configured cage and their enclosed, artificially configured cargo elements.

1 17. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the man-made cage calculatedly reduces natural and man-made contaminant
3 background radiation to artificially configured cargo carried within the artificially configured
4 cage.

1 18. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 3, wherein the man-made vesicle reduces natural and man-made contaminant
3 background radiation to artificially configured cargo carried within the man-made vesicle.

1 19. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, comprising

3 an artificial, self-assembling framework of artificially configured cages ~~to that by human design~~
4 structurally support one or more self-assembling artificial QIP quantum information processing
5 elements.

1 20. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, comprising

3 an artificially configured, self-assembling, electrically neutral substrate of artificially configured
4 cages to structurally support one or more of the artificially configured self-assembling,
5 artificially configured quantum information processing elements, forming a calculated design.

1 21. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, comprising an artificially configured self-assembling framework of artificially
3 configured cages to structurally order one or more self-aligning artificial quantum information
4 processing elements, forming a calculated design.

1 22. (Currently Amended): A non-natural quantum information processing platform
2 according to claim 1, wherein the one or more cargo elements of a subset of the quantum
3 information processing elements is a single cargo element comprising a qubit programmable into
4 a plurality of logical states.

1 23. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the ~~one or more~~ plurality of artificially configured cargo elements of a subset
3 of the artificially configured quantum information processing elements are a plurality of
4 artificially configured cargo elements.

1 24. (Currently Amended): A non-natural quantum information processing platform
2 according to claim 23, wherein the plurality of artificially configured cargo elements are man-
3 made, artificially configured qubits is calculatedly programmable into a plurality of logical
4 states.

1 25. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 23, wherein at least some of the plurality of artificially configured cargo elements are
3 non-natural, non-quantum information processing cargo elements.

1 26. (Currently amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the one or more artificial elements of a subset of the artificially configured
3 quantum information processing elements calculatedly respond to artificially directed stimuli
4 internal and external to the cage.

1 27. (Currently amended): A non-natural quantum information processing platform according
2 to claim 3, wherein the one or more vesicles of a subset of the quantum information processing
3 elements respond to stimuli internal and or external to the vesicle.

1 28. (Currently amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the one or more quantum information processing elements and their qubit
3 and non-QIP cargo are used in vitro and or in vivo.

1 29. (Currently amended): A non-natural quantum information processing platform according
2 to claim 23, wherein a subset of the artificial non-quantum information processing cargo
3 elements include one or more therapeutic artificially configured single task and or multitask in
4 vivo and in vitro agents that are calculatedly induced to perform a specific task.

1 30. (Cancelled):

1 31. (Cancelled):

1 32. (Cancelled):

1 33. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 23, wherein a subset of non-naturally occurring qubit and non-quantum information
3 processing cargo elements include one or more man-made, selectable emission quantum dots that
4 calculatedly perform one or more logical operations using spin, and also deliberately having
5 minimal material surrounding the quantum dot, which, by reducing contaminating background
6 radiation, increases quantum coherence times and improves the performance of a quantum
7 computer system and also improves the scalability of a quantum dot-based quantum computer.

1 34. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 23, wherein a subset of the qubit and non-quantum information processing cargo
3 elements include one or more man-made, selectable emission photonic dots that calculatedly
4 perform one or more logical operations using spin, and also deliberately having minimal material
5 surrounding the photonic dot, which, by reducing contaminating background radiation, increases
6 quantum coherence times and improves the performance of a quantum computer system and also
7 improves the scalability of a photonic dot-based quantum computer.

1 35. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 23, wherein a subset of the artificial cargo elements intentionally include one or more
3 artificially configured liquids without artificial dopants or with one or more artificial dopants of
4 any suitable man-made type that calculatedly produce a desired effect.

1 36. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 23, wherein a subset of the non-naturally occurring qubit and non-quantum information
3 processing cargo elements include a artificially configured gas or vapor without dopants or with
4 one or more artificially configured dopants of any suitable man-made type that calculatedly
5 produce a desired effect.

1 37. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the at least one non-naturally occurring qubit of a subset of the plurality of
3 artificially configured quantum information processing elements are intentionally programmed to
4 perform logical operations by one or more calculated man-made pulses of electromagnetic
5 radiation, via which qubit cargo elements and their operations calculatedly function as man-made
6 quantum memory, register, bus, wire, logic gate, communications, error correction, i/o module,
7 encoder, decoder, and other information processing functions not found in nature.

1 38. (Cancelled):

1 39. (Cancelled):

1 40. (Cancelled):

1 41. (Currently amended): A non-natural quantum information processing platform according
2 to claim 1, wherein ~~the~~ at least one non-naturally occurring qubit of a subset of the quantum
3 information processing elements ~~includes an unpaired electron~~ and the plurality of logical states
4 of the qubit are defined by one or more electron spin polarization properties and or attributes.

1 42. (Cancelled):

1 43. (Cancelled):

1 44. (Currently amended): A non-natural quantum information processing platform according
2 to claim 1, wherein ~~the~~ at least one non-naturally occurring qubit of a subset of the artificially
3 configured quantum information processing elements includes ~~a nitroxide molecule~~ one or more
4 species of molecules that are calculatedly induced to have one or more logical states, which
5 molecules can be calculatedly expressed as man-made quantum memory, register, bus, wire,
6 logic gate, communications, error correction, i/o module, encoder, decoder, and other
7 information processing functions not found in nature..

1 45. (Cancelled):

1 46. (Currently amended): A non-natural quantum information processing platform according
2 to claim 1, wherein ~~the~~ at least one non-natural qubit of a subset of the artificially configured

quantum information processing elements includes a qubit that is photon-based and the plurality of calculatedly induced logical states of the photon-based qubit includes an artificially induced coherent logical state, which state can be calculatedly expressed as man-made quantum memory, register, bus, wire, logic gate, communications, error correction, i/o module, encoder, decoder, and other information processing functions not found in nature.

47. (Currently Amended): A non-natural quantum information processing platform according to claim 1, wherein the calculated plurality of logical states includes an artificially induced coherent state, which state can be calculatedly expressed as man-made quantum memory, register, bus, wire, logic gate, communications, error correction, i/o module, encoder, decoder, and other information processing functions not found in nature.

48. (Currently Amended): A non-natural quantum information processing platform according to claim 1, wherein the plurality of calculatedly induced logical states includes an artificially induced coherent state at room temperature, which state can be calculatedly expressed as man-made quantum memory, register, bus, wire, logic gate, communications, error correction, i/o module, encoder, decoder, and other information processing functions not found in nature.

49. (Currently Amended): A quantum information processing platform according to claim 1, wherein the cage bioengineered in whole or in part.

50. (Currently Amended): A non-natural quantum information processing platform according to claim 1, wherein the self-assembling protein molecule is a purified clathrin molecule

51. (Currently Amended): A non-natural quantum information processing platform according to claim 1, wherein the cage comprises artificially configured, self-assembling synthetic protein molecules.

52. (Currently amended): A non-natural quantum information processing platform according to claim 4, wherein artificial and artificially configured receptors, adaptors, and vesicle comprise natural and or synthetic protein molecules.

53. (Currently Amended): A non-natural quantum information processing platform according to claim 4, wherein the receptors, adaptors, and vesicle are bioengineered in whole or in part.

54. (Currently amended): A non-natural quantum information processing platform according to claim 1, wherein at least a portion of the artificially configured cage is ~~metal~~-artificially coated in one or more materials that enhance functional performance of the cage.

1 55. (Currently amended): A non-natural quantum information processing platform according
2 to claim 4, wherein at least a portion of the artificially configured receptors, adaptors, and or
3 man-made vesicle is ~~metal~~ artificially coated in one or more materials that enhance functional
4 performance.

1 56. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the man-made cage is artificially induced to be substantially greater than one
3 nanometer in diameter.

1 57. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the man-made cage is artificially induced to be at least about 50 nanometers
3 in diameter.

1 58. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the man-made cage is artificially induced to be at least about 100 nanometers
3 in diameter.

1 59. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein the cage is artificially induced to be symmetric with respect to a plane in
3 order to facilitate a calculated result.

1 60. (Currently Amended): A non-natural quantum information processing platform element
2 according to claim 1, wherein the artificially configured cage has been artificially ordered to
3 have icosahedral geometry in order to facilitate a calculated result.

1 61. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein at ~~least~~ least one of the plurality of man-made cages includes a plurality of
3 artificially configured qubits and a subset of the plurality of qubits are intentionally and linearly
4 positioned by means of artificial inducement at one or more desired vertices along a single plane
5 using circulant ordering in order to facilitate a calculated result.

1 62. (Currently Amended): A non-natural quantum information processing platform according
2 to claim 1, wherein by means of artificial inducement a subset of the quantum information
3 processing elements are physically linked together, which elements can be calculatedly
4 expressed as quantum memory, register, bus, wire, logic gate, communications, error correction,
5 i/o module, encoder, decoder, and other information processing functions not found in nature.

1 63. (Currently amended): A non-natural quantum information processing platform according
2 to claim 1, wherein by means of artificial inducement a subset of the artificially configured

quantum information processing elements are functionally linked together, ~~either~~ locally and or at an arbitrary distance, which quantum information processing elements can be calculatedly expressed as man-made quantum memory, register, bus, wire, logic gate, communications, error correction, i/o module, encoder, decoder, and other information processing functions not found in nature.

64. (Currently Amended): A non-natural quantum information processing ~~element~~ platform according to claim 1, comprising
an encoder for programming the at least one qubit of a subset of the quantum processing elements.

65. (Currently Amended): A non-natural quantum information processing ~~element~~ platform according to claim 1 comprising,
a decoder for reading information out of the at least one artificial qubit of a subset of the artificially configured quantum processing elements.

66. (Currently amended): A non-natural quantum information processing platform according to claim 1, wherein a subset of the artificially configured quantum information processing elements calculatedly form an artificial hybrid system upon their being artificially induced to perform physical and or functional integration with one or more non-invention elements in vitro and in or vivo.

67. (Currently Amended): A method for a non-naturally occurring quantum information processing platform offering precise control over its fabrication and operation comprising,
providing one or more artificially configured quantum information processing elements, each artificial quantum information processing element comprising
a man-made cage up to 100 nanometers in diameter defining a calculated, man-made cavity formed from a plurality of artificially induced self-assembling purified Clathrin protein molecules,
and
one or more artificially configured cargo elements located within the man-made cavity, wherein,
at least one of the non-natural cargo elements comprises a non-naturally occurring qubit that is by design programmable into a plurality of logical states;
explicitly programming the one or more quantum information processing elements using
an man-made encoder;

14 and

15 reading information from the one or more quantum information processing elements

16 using a man-made decoder.

68. (Currently Amended): A quantum information processing platform according to claim 1,
wherein the quantum information processing elements comprise,

a functionalized artificially configured cage for calculatedly attaching one or more
artificial elements external to the artificially configured cage.